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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/196,185	11/20/1998	MYUNG-KOO HUR	6192.0052.AA	8847

7590 10/06/2005
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EXAMINER

QI, ZHI QIANG

ART UNIT PAPER NUMBER

2871

DATE MAILED: 10/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/196,185

Applicant(s)

HUR ET AL.

Examiner

Mike Qi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,6-14 and 18-26 is/are pending in the application.
- 4a) Of the above claim(s) 1-3,6-13 and 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 14 and 21-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 14, 21-24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,852,481 (Hwang) in view of US 5,162,933 (Kakuda et al) and JP 05241173 (Yatabe et al).

Regarding claims 14, 23-24 and 26, Hwang discloses (col.1, line 36 – col.2, line 5; Figs.1A-1D) that a conventional thin film transistor (TFT) panel comprising:

- an insulating substrate (glass substrate 10);
- gate electrode layer (11, 12) formed on the substrate (10) which is connected with gate line, gate electrode and gate pad, so as to constitute gate wire on the substrate (10) having gate line, gate electrode and gate pad; such that the gate wire would be two layers structure comprising a main layer and a supplemental layer;
- a gate insulating layer (15) covering the gate wire (11,12);
- a semiconductor layer (17) formed on the gate insulating layer (15);
- source/drain electrodes (19) formed on the semiconductor layer (17) which is connected with data line and data pad, so as to constitute data wire on the semiconductor layer (17) having data line, data electrode and data pad;

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- a passivation layer (21) formed on the data wire and the gate wire, and having one contact hole extended to the gate pad (12) and another contact hole extended to the drain electrode (19);
- a transparent conductive layer (indium tin oxide, ITO, to form pixel electrode 22) formed on the passivation layer (21), and connected to the gate pad (12) and the data wire (source/drain electrodes) through contact holes.

Hwang does not explicitly disclose that:

1) the data wire comprise a main layer and a supplemental layer;

2) the main layer comprises metal or metal alloy and the supplemental layer comprises metal nitride or metal alloy nitride being inert to an etchant for preventing the gate pad or the data wire from being eroded by the etchant.

Kakuda discloses (col.10, line 30 – col.11, line 55; Fig.8) that the gate line (13) and the data line (11), both of them, are formed by laminating metal layers (13a, 13b; 11a, 11b) such as MoCrx and aluminum layers (two-layer structure, and the MoCrx layer having function of supplemental layer having chromium and the aluminum layer having function of main layer comprising metal), and such laminated metal layers prevents the generation of hillock and its surface remained smooth, and the thin film transistors formed on such a layer remarkably decreasing the number of shorts, and reducing the sheet resistance so as to obtain high-speed of the data line by employ such laminated wiring structure. As generally available knowledge, the chromium having erodent resist property.

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Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the liquid crystal display of Hwang with the teachings of the gate line and the data line using metal main layer and supplemental layer such two layers structure as taught by Kakuda, since the skilled in the art would be motivated for several advantages such as preventing the generation of hillock and the erodent resist (see col.10, line 30 – col.11, line 55).

Hwang and Kakuda teach the invention set forth above except for the supplemental layer comprises metal nitride or metal alloy nitride and being inert to an etchant for preventing the gate pad or the data wire from being eroded by the etchant.

Yatabe discloses (abstract) that the material of the electrode for liquid crystal display comprising metal nitride that is a solvent-resistant layer or air permeation resistant layer. Therefore, the metal nitride has such property to resist the solvent effect and air permeation effect, and being inert to an etchant. Yatabe indicates (abstract) that using such metal nitride to obtain electrode (any electrode) enables high quality display.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the liquid crystal display of Hwang and Kakuda with the teachings of using metal nitride as the supplemental layer as taught by Yatabe, since the skilled in the art would be motivated for the metal nitride having a solvent-resistant property so as to be inert to an etchant (see abstract).

Regarding claims 21-22, Hwang discloses (col.1, line 67 – col.2, line 5; Fig.1) that a transparent conductive layer (indium tin oxide, ITO, to form pixel electrode 22) formed on the passivation layer (21), and connected to the drain electrode (19) through

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a contact hole; and also using such ITO (gate ITO) connected to the gate pad (12) though another contact hole.

3. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hwang, Kakuda and Yatabe as applied to claims 14, 21-24 and 26 above, and further in view of US 4,141,022 (Sigg et al).

Regarding claim 25, Hwang, Kakuda and Yatabe teach the invention set forth above except for the supplementary layer further comprising tungsten or chromium or zirconium or nickel.

Sigg discloses (col.1, line 62 – col.2, line 3) that the supplemental layer using chromium, because chromium is an etch resistant metal to protect the metal structure from being etched by the chemical etchant. As a generally available knowledge, tungsten or chromium or zirconium or nickel has the property of etch resistant.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to modify the liquid crystal display of Hwang, Kakuda and Yatabe with the teachings of using chromium forming the supplementary layer, since the skilled in the art would be motivated for protecting the metal structure from being etched by the chemical etchant (see col.1, line 62 – col.2, line 3).

Response to Arguments

4. Applicant's arguments filed on Sep.2, 2005 have been fully considered but they are not persuasive.

(1) The reference Hwang is relied on the basic LCD structure, and a transparent conductive layer (ITO) formed on the passivation layer and connected to the gate pad, and the gate wire having two layers structure.

(2) The reference Kakuda is relied on the gate wire (13a13b of Fig.8) and the data wire (11a,11b of Fig.8) having two layers laminated structure (a main layer and a supplemental layer). Some references such as US 6,107,668 (Ukita) also discloses such laminated wire technique in which (col.4, lines 51-57) the tungsten nitride film (metal nitride) is highly resistive to the chemicals and suppresses the metal from the corrosion of the electrode by the etchant.

(3) The reference Yatabe is relied on the material of the electrode for liquid crystal display comprising metal nitride that is a solvent-resistant layer or air permeation resistant layer.

(4) The reference Sigg is relied on using chromium as the supplementary layer.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299.

The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi
September 28, 2005


ANDREW SCHECHTER
PRIMARY EXAMINER